Remarks

Applicants respectfully request that the Examiner reconsider the present application in light of the above amendments and following remarks. Claims 1, 6-8 and 10-12 have been amended, claim 5 has been cancelled, and claims 13-15 have been added. Therefore, claims 1-4 and 6-15 are pending in the present application.

Claims 1-4, 9 and 12 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,630,264 to Haltiner, Jr. et al. ("the Haltiner reference"). Applicants respectfully traverse this rejection in view of the above amendments.

Amended claim 1 is directed to a system for monitoring the performance of a hydrocarbon reformer, wherein the reformer produces a reformate output. *See Specification*, pg. 3, lines 16-17. The system comprises a quantitative hydrocarbon sensor, a slipstream for providing a sample of the reformate output of the reformer, and a source of air for combining with the sample of the reformate output to form a mixture. *See Specification*, pg. 4, lines 1-11. The mixture is provided to the quantitative hydrocarbon sensor for measuring hydrocarbon content of the reformate. *See id.*

The Haltiner reference does not teach or suggest a system including a source of air for combining with the sample of the reformate output to form a mixture, wherein the mixture is provided to the quantitative hydrocarbon sensor for measuring hydrocarbon content of the reformate as recited in amended claim 1. The Examiner acknowledged in the Office Action that the Haltiner reference does not explicitly disclose providing air to the sensor. *See Office Action*, pg. 3, ¶ 3.

Instead, FIG. 1 of the Haltiner reference merely shows reformate being fed from the reformer (22) to the gas sensor (50). Thus, Applicants request that the rejection based on the Haltiner reference be withdrawn.

U.S. Patent No. 6,083,637 to Walz et al. ("the Walz reference") also does not teach the aforementioned limitation in amended claim 1. In the Office Action, the Examiner indicated that column 3, lines 1-7 of the Walz reference discloses that the reformate and air are fed to a sensor prior to entering the fuel cell. *See Office Action*, pg. 3. While the Walz reference may disclose reformate and air being fed to a sensor, the sensor is configured such that the air and the reformate are not mixed with one another. The Walz reference specifically states that the sensor has the structure of an individual fuel cell, as such, the reformate will flow through the sensor without combining with the air so that the quality of the air and the reformate can be separately ascertained prior to being fed to the fuel cell arrangement. *See Walz*, Col. 3, lines 1-7. Thus, the reformate and the air are not mixed and provided to the sensor.

For at least the foregoing reasons, Applicants submit that the Haltiner and Walz references do not teach or suggest a source of air for combining with the sample of the reformate output to form a mixture, wherein the mixture is provided to the quantitative hydrocarbon sensor for measuring hydrocarbon content of the reformate as set forth in amended claim 1. As claims 2-4 and 9 depend from claim 1, these claims are also not taught or suggested by the Haltiner and Walz references for at least the same reasons that were set forth with respect to claim 1. It is requested that the rejection of claims 2-4 and 9 be withdrawn.

Amended claim 12 is directed to a fuel cell system comprising a fuel cell stack, a hydrocarbon reformer for supplying gaseous fuel in the form of reformate to said stack, a quantitative hydrocarbon sensor, a slipstream for providing a sample of the reformate, and a source of air for combining with the sample of the reformate output to form a mixture. The mixture is provided to the quantitative hydrocarbon sensor for measuring hydrocarbon content of the reformate.

For at least the same reasons that were set forth with respect to claim 1, Applicants submit that the Haltiner and Walz references do not teach or suggest a fuel cell system including a source of air for combining with the sample of the reformate output to form a mixture, wherein the mixture is provided to the quantitative hydrocarbon sensor for measuring hydrocarbon content of the reformate as recited in amended claim 12. It is therefore requested that the rejection of claim 12 be withdrawn.

Claims 5 and 10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Haltiner reference in view of the Walz reference. Claim 5 has been cancelled, therefore the rejection of claim 5 is moot. Claim 10 depends from claim 1, therefore claim 10 is not taught or suggested by the Haltiner and Walz references for at least the same reasons that were set forth with respect to claim 1. In particular, the Haltiner or Walz references do not teach or suggest a system including a source of air for combining with the sample of the reformate output to form a mixture, wherein the mixture is provided to the quantitative hydrocarbon sensor for measuring hydrocarbon content of the reformate as recited in amended claim 1. It is therefore requested that the rejection of claim 10 be withdrawn.

Since neither the Haltiner reference nor the Walz reference teaches all of the limitations included in claim 1, Applicants request that the rejection of claim 10 be withdrawn.

Claims 6-8 have been objected to as being dependent upon a rejected base claim, but the Examiner indicated that these claim would be allowable if rewritten in independent form. *See Office Action*, pg. 4. Therefore, claim 6 has been rewritten in independent form to include all of the limitations from claims 1 and 5. However, claim 6 has been amended to include a slipstream, instead of the means, for providing a sample of reformate output of the reformer in original claim 1, and a source of air, instead of means, for providing air to the sensor as provided in original claim 5. *See Specification*, pg. 4, lines 1-11. The preamble of claim 6 has also been amended to state that the reformer produces a reformate output to provide proper antecedent basis therein. *See Specification*, pg. 3, lines 16-17. Furthermore, claims 6-8 have been amended to provide a control, instead of a means, for combining the air and the reformate sample in a fixed and predetermined ratio. *See Specification*, pg. 4, lines 12-13. Applicants submit that claims 6-8 are in proper form for allowance.

Claim 11 depends from claim 1 and states that the reformer supplies the reformate output to a fuel cell, and the system further comprises a control for shutting down the fuel cell. *See Specification*, pg. 4, lines 16-19. The Office Action does not make any specific rejection in regard to claim 11, therefore Applicants respectfully request a clarification as to the status of claim 11.

New claim 13 states that claim 12 further includes a positive displacement pump for combining the sample of the reformate with the air, wherein the positive displacement pump positively closes off flow of the sample of the reformate to the quantitative hydrocarbon sensor when the fuel cell is idle. *See Specification*, pg. 2, lines 27-29.

New claim 14 states that claim 1 further comprises a positive displacement pump for metering a desired flow of the mixture through the quantitative hydrocarbon sensor. *See Specification*, pg. 4, lines 10-11.

New independent claim 15 is directed to a system for monitoring the performance of a hydrocarbon reformer, wherein the reformer produces a reformate output. The system comprises a quantitative hydrocarbon sensor, a slipstream for providing a sample of the reformate output of the reformer to the sensor, a source of air for providing air to the sensor; and a control for combining the air and the reformate sample so that a lower explosive limit of 4 percent hydrogen is not exceeded. *See Specification*, pg. 4, lines 6-7.

Conclusion

In light of the foregoing, Applicants submit that claims 1-4 and 6-15 are in condition for allowance and such allowance is respectfully requested. Should the Examiner feel that any unresolved issues remain in this case, the undersigned may be contacted at the telephone number listed below to arrange for an issue resolving conference.

The Commissioner is hereby authorized to charge the $200.00 fee for the one additional independent claim in excess of three, and any other fee that may have been overlooked, to Deposit Account No. 10-0223.

Respectfully submitted,

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